

A NEW SUBSPECIES OF THE SNAKE *LICHANURA TRIVIRGATA*
FROM CEDROS ISLAND, MEXICO

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ABSTRACT.—A new subspecies, *Lichanura trivirgata bostici*, from Cedros Island, Baja California del Norte, Mexico, is described, figured, and compared to other taxa of the genus.

During an expedition to the islands adjacent to the Pacific coast of Baja California del Norte, Mexico, Mr. Dennis L. Bostic, the late chairman of the Department of Life Sciences at Palomar College, San Marcos, California, collected two unusual specimens of *Lichanura trivirgata* from Cedros Island on 2 February 1974. These specimens represent a new insular record and constitute the second report of the species from a Pacific island, *L. trivirgata* having been previously recorded from Natividad Island (Bostic 1973). The color and pattern of four specimens now available from Cedros Island is significantly distinct from specimens presently known in research collections.

The species and subspecies of *Lichanura* are differentiated primarily by pattern and color, with some attention given to scale characters (Klauber 1931). Klauber noted considerable variation within the genus, but elected to describe the subspecies *L. roseofusca gracia* from desert forms having even edged stripes. Additional material has failed to produce sufficient evidence to change the methods and parameters set by Klauber (Gorman 1965, Bostic 1971). Therefore, the aforementioned trend is continued in the following new subspecies. All descriptive color references are the standardizations of Ridgeway (1912) compared to living specimens.

Lichanura trivirgata bostici, subsp. nov.
Cedros Island Boa

HOLOTYPE.—BYU 41385, an adult male, from the Gran Cañon on the eastern shore

of Cedros Island, Baja California del Norte, Mexico, collected approximately 10 m above the tide line from beneath beach litter at 1000 hours on 2 February 1974 by Mr. Dennis L. Bostic.

PARATYPES.—BYU 42355 and BYU 42356, both adult males taken approximately 1.5 km west of town in a large arroyo on the southern end of Cedros Island on 3–4 July 1978 respectively by Mr. Michael D. Mahlstedt and myself.

DIAGNOSIS.—A subspecies of *Lichanura trivirgata* that is distinguished from the nominate subspecies in having narrower longitudinal stripes which are black, rather than the typical brown; a darker ground color being yellowish in juveniles to a pale brownish in adults, rather than the usual cream color; and a yellowish ventrum with more numerous black blotches and stipling. It is further differentiated from *t. trivirgata* as well as *r. roseofusca* and *r. gracia* in that the ventral edges of the dorsolateral stripes are separated from the ventrum by 10 or more scale rows; *t. trivirgata* and *r. gracia* have seven to nine rows of separation. The irregular stripes of *r. roseofusca* may nearly reach the ventral scutes (specimens designated as *r. gracia* from the central portion of Baja California del Norte may be intergrades between *r. roseofusca* and *t. trivirgata* and closely approximate *t. bostici* in scutellation and dorsal pattern).

Lichanura trivirgata bostici closely approximates *t. trivirgata* in most scale characters; however, means for labials and subcaudals are high, being closer to those set for *r. roseofusca* and *r. gracia* (Tables 1 and 2).

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TABLE 1. Scale and pattern characters for mainland *Lichanura*.

	<i>L. trivirgata</i>	
	Gorman ¹ Cape region	Klauber ² Cape region
Dorsals	39.2(36-41)10	41.4(40-43)7
Ventrals	218.5(219-223)10	222.0(218-227)7
Caudals	45.0(42-49)10	44.0(42-46)7
Oculars	10.1(9-11)10	9.7(9-11)9
Supralabials	12.8(12-14)10	12.8(12-13)7
Infralabials	13.8(13-15)10	13.8(13-15)7
Scales between dorsolateral stripes and ventrals		8.4(7.5-9.5)8
Dorsal stripe width		4.75(4-5)8
Dorsolateral stripe width		5.25(5-6)8

¹Data from Gorman (1965).²Data from Klauber (1931).

Includes data from Bostic (1971).

DESCRIPTION OF HOLOTYPE.—An adult male, total length 597 mm, tail 96 mm, head length 21 mm, head width 12 mm; ratio of tail into total length 6.2, head into total length 28.4, head into body length 23.8. Dorsal scale rows on body 39-39-27, at center of tail 17; ventrals 216, subcaudals 47, anal entire; supralabials 14-15, number of elongate supralabials 2-2, infralabials 15-15, the first pair meeting at the midline; oculars 10-10; supraloreals 3-3, infraloreals 4-4; intersupraoculars 5.

Top of head is nearly flat, covered with small smooth scales. Rostral pentagonal, slightly wider (3.0 mm) than high (2.7 mm) and recurved. Nasals are divided; prenasals curving over snout to meet on the median line.

Dorsal pattern consists of three longitudinal stripes, one middorsal that is four scale rows wide and a dorsolateral stripe on each side being three to four scale rows wide at midbody. Interspaces are three to four scale rows wide between the longitudinal stripes along the body. Stripes are irregular on the head. The middorsal stripe begins on the rostrum and disappears on the last quarter of the tail; the dorsolateral stripes begin at the nasals, pass through the eyes, terminating at the tip of the tail. Stripe color is black and that of the interspaces is buffy brown with occasional tiny black flecks at the bases of scales. The stripes have slightly serrated edges often bisecting a scale which presents a rather even edge. Ten scale rows separate

the ventral edge of the dorsolateral stripes from the ventrals.

The ventrum is pale ochraceous-salmon with a generous amount of black blotches and stippling. The upper portions of the supralabials have minute black patches; infralabials are similarly marked along the edge of the mouth. The chin and gular region is yellowish and nearly without stippling. The eyes are light brown and have vertical pupils. The tongue is black with a white fork.

RANGE.—Known only from Cedros Island, on the Pacific coast of Baja California del Norte, Mexico.

GENERAL DESCRIPTION.—In general appearance *t. bostici* is darker than *t. trivirgata*. Two adult male paratypes BYU 42355 (total length 695; tail length 103) and BYU 42356 (total length 580; tail length 62) from the southern end of Cedros Island have the same basic characters of the type; however, BYU 42355 has extremely heavy black mottling on the ventrum (see Table 1 for scale counts). A juvenile male specimen² from the type locality differs in that the interspaces between the longitudinal stripes are buckthorn brown and the ventrum is more yellowish than in adults.

REMARKS.—Insular *Lichanura* was first reported by Van Denburgh (1922:633) from a single dried specimen collected by Mr. J. R. Slevin on Mejía Island in the Gulf of California. Cliff (1954:70) provided additional information stating that it had been found

²This specimen, known as DLB 3327, collected with the type by Mr. Bostic, has apparently been lost; characters were taken from this specimen while living.

L. roseofusca

San Ignacio ¹	Arizona-Sonora ¹	<i>roseofusca</i> ²	<i>gracia</i> ²	<i>L. r. gracia</i> ¹ from Central Desert
40	39.2(37-42)16	40.0(35-43)38	41.3(40-43)9	41.2(39-42)10
224	218.2(211-228)16	232.0(221-224)38	230.0(220-236)9	224.3(215-231)10
44	45.8(42-48)16	47.0(39-51)38	46.0(42-49)9	46.25(43-48)10
10	11.0(9-12)16	9.1(7-10)38	9.8(8-11)9	10.2(10-11)10
12.5	14.3(13-15)16	14.1(12-15)38	14.1(13-15)9	14.35(13-15)10
12-13	14.8(13-16)16	15.0(13-17)38	15.4(14-17)9	15.25(14-16)10
—	8.2(7.5-9)13	—	7.5(7-9)6	9.4(8-11)15
—	5.0(4.5-5.5)13	—	5.2(5-6)6	4.5(4-5)15
—	5.8(5-7)13	—	6.5(7-9)6	5.4(4-7)15

under a rock on 28 June 1921 and determined it to be *Lichanura roseofusca gracia* because the even-edged, red-brown, longitudinal stripe is present. In spite of numerous expeditions, the genus was not taken from another island until March 1962. These specimens, as reported by Gorman (1965) and Soulé and Sloan (1966:144), are *t. gracia* (SDSNH 51999) from Ángel de la Guarda Island and *t. trivirgata* from Tiburon Island (SDSNH 52898) and San Marcos Island (SDSNH 44389), all located in the northern portion of the Gulf of California. Powers and Banta (1976) reported a single specimen (R2002 NHSM) of *t. trivirgata* from Cerralvo Island, the first record of the genus from the southern Gulf of California island.

Lichanura t. trivirgata has been recorded by Bostic (1973, checklist) from Natividad Island, several kilometers north by northwest of Punta Eugenia and 21 km south of Cedros Island on the Pacific coast of Baja California del Norte. I have not seen a specimen and I am not aware of any new specimens in collections; therefore its occurrence can only be a tentative claim at this time.

Although Gorman (1965) followed Klauber (1931:309) and showed that insufficient evidence existed to unite *roseofusca* and *trivirgata*, Soulé and Sloan (1966) classified their specimens as different races of the species *trivirgata*. Bostic (1971:257), however, demonstrated that a basis for uniting the two species is lacking due to the absence of obvious intergrades.

Some of the data presented by Gorman (1965) and Soulé and Sloan (1966) are in

conflict. Each has given different counts for ventrals and subcaudals for the specimen from Tiburon Island (SDSNH 52898) and for ventrals for the San Marcos Island specimen (SDSNH 44389). Powers and Banta (1976, Table 1) further confuse the issue by creating three specimens from the only example known from Tiburon Island (SDSNH 52898). They presented the two conflicting scale counts given by Gorman and by Soulé and Sloan as two different specimens and have included the counts of Soulé and Sloan from the San Marcos specimen (SDSNH 44389) as a third. They have also indicated Gorman (1965) as the source for scale counts given by Soulé and Sloan (1966) for the San Marcos Island specimen (SDSNH 44389). Corrected counts are presented in Table 2.

GENERAL HABITAT RELATIONSHIPS.—Savage (1967) stated that the climate of Cedros Island is milder and more moist than the immediately adjacent mainland areas (Central and Viscaïno deserts), and that most of the island is covered with a desert scrub vegetation. A closed-cone pine association mixed with chaparral occurs at higher elevations. Three endemic species and endemic subspecies of the three additional species (*Gerrhonotus cedroensis*, *Phrynosoma cerroense*, *Crotalus exsul*; and *Crotaphytus wislizeni neseotes*, *Pituophis melanoleucus insulanus*, and *Hypsiglena torquata baueri*) are restricted to Cedros Island in addition to *L. t. bostici*.

Savage (1967) also discusses at length the herpetological distribution and population of the Pacific islands. He (1967:225) mentions evidence presented by Muller and Ax-

elrod (in symposium) demonstrating that many islands appear to be refugia of relicts. In discussing relict populations, comparisons between species of the lizard genus *Anniella* indicate that *A. geronimensis* is being replaced by *A. pulchra* on the mainland, which may eventually lead *A. geronimensis* to become an insular relict.

The habitat of the lower arroyos and the climate of Cedros Island are somewhat similar to the Punta Eugenia-Sierra Viscaino region, particularly along the coast line. This evidence suggests that *Lichanura trivirgata bostici* may have experienced or may still be experiencing a competitive pressure from the mainland *L. t. trivirgata* similar to that being presently expressed in *Anniella*.

The habitat of Cedros Island appears to be more typical of areas where *L. roseofusca gracia* may be found. On the basis of evidence presented, a race closely allied to *L. trivirgata* is existing under conditions more typical to *L. roseofusca*.

At present the closest known locality of *L. trivirgata* to Cedros Island is just west of San Ignacio; however, more intensive collecting toward the Punta Eugenia-Sierra Viscaino region may produce specimens. The closest known locality for *L. roseofusca* lies just north of San Javier (Bostic 1971:257) in Baja California del Norte. If *L. trivirgata* reaches Punta Eugenia, the species would be less than 40 km from Cedros

Island, having Natividad Island midway between these points.

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TABLE 2. Scale and pattern characters for insular *Lichanura*.

	<i>L. r. gracia</i>	<i>L. trivirgata</i>			<i>L. trivirgata bostici</i>				No. of specimens	Mean
	Ángel de la Guarda	Tiburon ¹	San Marcos ¹	Cerralvo ²	BYU 41385	BYU 42355	BYU 42356 ¹	DLB 3327		
Dorsals	41	40	40	39	39	41	40	41	4	40.25
Ventrals	235	222	224	219	216	223	219	218	4	219
Caudals	49	43	41	40	47	47	30	45	3	46.3
Oculars	11-11	10-11	10-10	10-10	10-10	10-10	10-10	11-11	4	10.25
Supralabials	14-14	15-15	15-15	13-13	14-15	15-14	14-15	15-15	4	14.6
Infralabials	16-15	15-15	16-15	14-13	15-15	13-14	14-15	14-14	4	14.25
Scales between dorsolateral stripes and ventrals	9	9	8	9	10	10.5	10	—	3	10.2
Dorsal stripe width	4	4	6	4.5	4.0	4.0	4.5	—	3	4.2
Dorsolateral stripe width	4.5	4.5	6	5.5	4.0	4.0	3.5	—	3	3.8

¹Corrected scale counts for SDSNH 44389 and SDSNH 52898.

²Corrected scale counts for R2002 NHSM.

Tail incomplete.

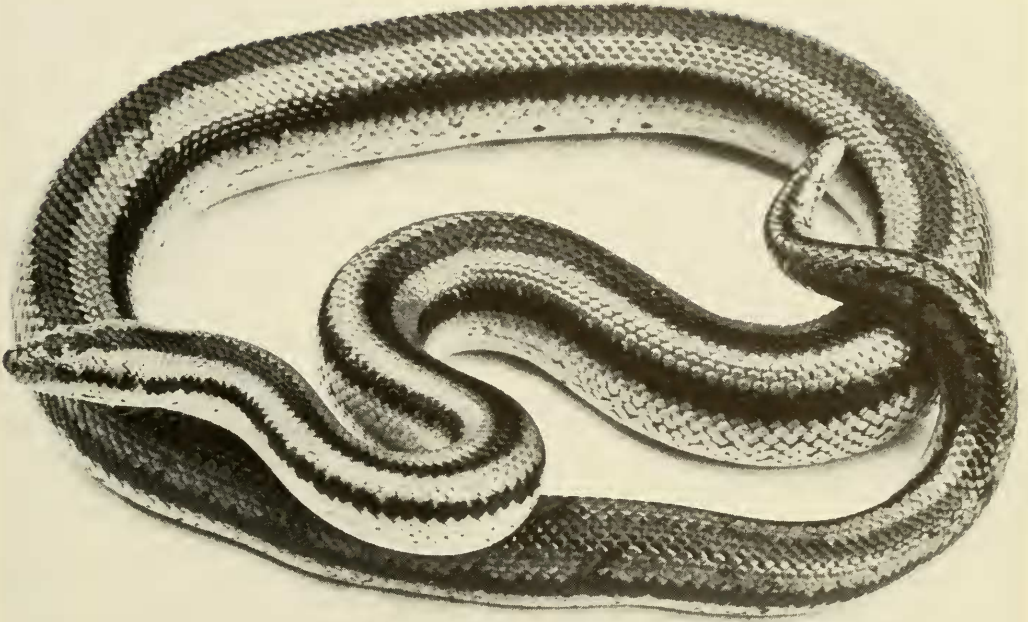


Fig. 1. Dorsal view of *Lichanura trivirgata bostici*, BYU 42355 (paratype), collected on the southern end of Cedros Island, 3 July 1978.

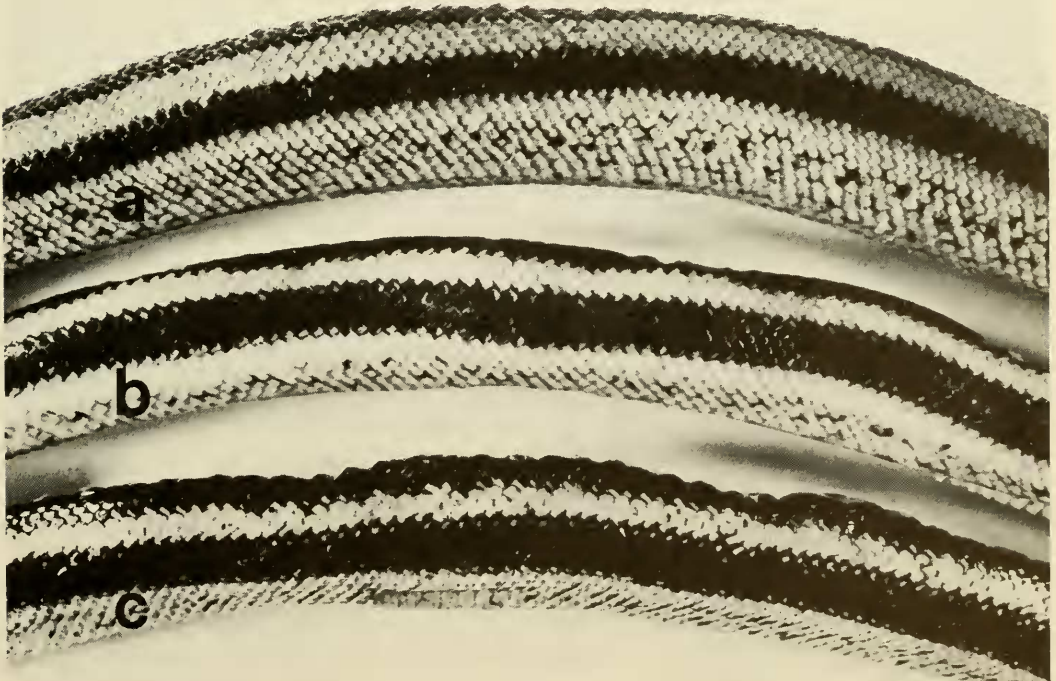


Fig. 2. Lateral view showing the narrower and higher dorsolateral stripe of (a) the holotype, compared with (b and c) specimens of *Lichanura t. trivirgata* from Baja California del Sur.

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